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EXAMINER	
JACOBSON, TONY M	
ART UNIT	**PAPER NUMBER**
2644	

DATE MAILED: 04/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/411,143	YUEN ET AL.	
	Examiner	**Art Unit**	
	Tony M Jacobson	2644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 December 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4 and 6-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4 and 6-36* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 June 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10 December 2004 has been entered.

Drawings

2. The drawings were received on 14 June 2004. These drawings are acceptable for examination purposes; however, upon allowance of the application, formal drawings will be required due to the informal proposed drawing amendments presented by Applicant and the outstanding deficiencies noted in the Notice of Draftsperson's Drawing Review mailed on 25 March 2004.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. **Claims 1-4, 6-12, 16-26, and 30-36** are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for modulating the amplitude

of a higher-frequency sound signal by a lower-frequency sound signal, **where the lower-frequency sound signal is derived from the envelope of the higher-frequency sound signal** (emphasis added), does not reasonably provide enablement for other forms of modulating the amplitude of a higher-frequency sound signal by a lower-frequency sound signal (e.g., squaring or rectifying and low-pass filtering a composite signal containing the lower-frequency signal and the higher-frequency signal [and possibly signal components of many other frequencies], and thereby forming intermodulation products of all frequency components thereof, or many other known or conceivable methods that would inherently produce an illusion of the lower-frequency signal, whether intended or not) that fall within the scope of the limitation (as recited in independent claims 1, 6, 20, 34, 35, and 36). The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims. Applicant generally describes at pages 28-42 of the specification and illustrates in Figs. 10-12B, 16, 17, 19, 28, and 38 the basic known phenomena of frequency heterodyning and "the detector effect" in the ear, and discloses details of two embodiments of automatic gain controls circuits (compressor 2610 of Fig. 28 and the expander comprising 3822, 3823, and 3824 of Fig. 38) for modulating the amplitude of a higher-frequency signal with a lower-frequency signal derived from the amplitude envelope of the higher-frequency signal, but does not disclose in an enabling manner any other method or means for performing the function recited in the claims. Examples of other means and processes that fall within the scope of this limitation, but are not enabled by Applicant's disclosure

are: intermodulation distortion (inherent to many audio systems), tremolo and vibrato circuits, and frequency aliasing in digitally sampled systems.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. **Claims 1-4, 6-13,16-27, and 30-36** are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwamatsu (US 5,999,630) in view of Short et al. (US 4,739,514).

7. Regarding **claims 1, 6, and 20**, Iwamatsu discloses in Fig. 5, a sound enhancement (audio correction) system (18) comprising:

an image correction (sound enhancement) module (38) configured to correct a vertical image (perceived height) of sound when said sound is reproduced by a plurality of loudspeakers (an apparent sound stage produced by a plurality of loudspeakers) (column 5, line 34 –column 6, line 11), said image correction module altering said sound as a first function of frequency over a first frequency range and altering said sound as a second function over a second frequency range, wherein said first function of frequency is independent of said second function of frequency (the image correction module [comprising two independent notch filters 38 in Fig. 5] alters said sound as a first

function of frequency [as shown generally in Fig. 7B] over a first frequency range [the range of frequencies illustrated in Fig. 7B] and alters said sound as a second function of frequency [also as shown generally in Fig. 7B] over a second frequency range [equal to the first frequency range], wherein said first function of frequency is independent of said second function of frequency [because the notch frequency "Nt" of each notch filter 38 is independently set by parameter calculation unit 62 according to independent sets of positional parameters r, θ, and φ for each signal channel, as illustrated in Fig. 5 and described at column 7, lines 51-64]); and

an image (sound) enhancement module (64) configured to spectrally shape difference information associated with said sound to enhance (correct) a horizontal image (perceived width) of the apparent sound stage (produced by the loudspeakers) (column 1, lines 5-54). (As should be apparent to one of ordinary skill in the art, summing a slightly delayed version of a given channel signal with the opposite channel signal in a stereophonic signal pair inherently spectrally shapes difference information associated with the sound represented by the stereophonic signal pair. (Iwamatsu discloses at column 8, lines 40-42 that the time delay "d" in the crosstalk cancellation network 64 of Fig. 10 is about 0.6 milliseconds; and when such a delayed signal is cross-coupled to the opposite channel with a negative gain as illustrated, a partial comb-filter modification of difference information will inherently occur, producing dips at odd multiples of 833 Hz and peaks at even multiples of 833 Hz in the frequency response of the network to difference information).

Iwamatsu does not disclose a bass (sound) enhancement module configured to enhance a bass response of the sound (of the loudspeakers) when the sound is reproduced by the plurality of loudspeakers, said bass enhancement module modulat[ing] the amplitude of a higher-frequency signal with a lower-frequency signal to produce an illusion of the lower-frequency signal to a listener when said sound is reproduced by said plurality of loudspeakers.

Short et al. disclose in Figs. 1 and 3-7 various embodiments of an audio signal processing system comprising a bass compressor modulating the amplitude of a higher-frequency signal with a lower-frequency signal to enhance the perception of low-frequency sounds to a listener (column 5, lines 58-63). The typical operation of a compressor or expander (both broadly classifiable as automatic gain controls [AGC]) is normally to detect the envelope of an input audio signal, which envelope inherently has a lower frequency than the audio signal upon which it is based, and to apply that (lower-frequency) envelope signal (possibly inverted, negated, or otherwise modified, depending upon whether compression or expansion is desired and whether the voltage controlled amplifier [VCA] is a multiplying, dividing, or other type) to a multiplier or divider (or other type of VCA) along with the (higher-frequency) audio signal to modulate the amplitude of the (higher-frequency) audio signal according to the (lower-frequency) detected envelope of the audio signal and a desired dynamic gain characteristic; this is consistent with Applicant's disclosure at page 37, line 17 –page 38, line 10 (disclosing an expander in reference to Figs. 14 and 16); page 49, line 19 –page 53, line 24 (generally disclosing a compressor in reference to Figs. 24-28); and page 66, line 18 –

page 69, line 22 (describing a digital signal processing arrangement that "includes an expander circuit" [page 69, lines 11-18] with reference to Fig. 38). Short et al. disclose at column 4, lines 1-4 attack and release time constants of 0.1 seconds each, which, depending on the particular one of various known definitions of attack and release time constant used (e.g., 63% gain reduction decay, 3-dB gain reduction increase, or simple R-C time constant of peak detector), would correspond to a low-pass filter with a cutoff frequency on the order of roughly 0.7 Hz to 1.6 Hz applied to the peak rectified audio signal, which is lower than the frequency of audio-frequency signal components.

Although Short et al. do not disclose that such modulation of a higher-frequency signal with a lower-frequency signal is performed "to produce an illusion of the lower-frequency signal to a listener" when said sound is reproduced by said plurality of loudspeakers, the recitation of the intended purpose of this portion of the apparatus of claims 1 and 6 does not patentably distinguish the claimed invention from the prior art having the structure claimed; apparatus claims must be structurally distinguishable from the prior art (see MPEP 2112, 2114). Applicant's disclosure indicates that an automatic gain control (such as the compressor 2610 of Fig. 26B or an expander, as described at page 37, line 17 –page 38, line 10 of the specification) that varies a gain applied to a mid-bass signal in response to the envelope of that signal will produce an illusion of the lower-frequency to a listener. Since the arrangement of Short et al. meets the structural limitations of the bass enhancement ("second") module recited in the claims, it presumably provides the same benefits, whether or not it is therein recognized as such or described in the same terms used by Applicant. Short et al. generally disclose that

the bass enhancement arrangements disclosed provide the benefit of an audio response that is matched to the characteristics of human hearing over a variety of sound levels by enhancing the bass response at low levels.

At the time the present invention was made, it was well known in the audio signal processing arts to combine various known audio enhancement techniques and systems of the prior art in order to simultaneously enhance or improve multiple aspects of the sound produced. It would have been obvious to one of ordinary skill in the art at the time the present invention was made to combine the bass enhancement module of Short et al. with the system of Iwamatsu in order to provide a further enhanced acoustic output signal. The system so modified performs the method of **claim 20** in normal use. The recitation of "to produce in a listener an illusion of the missing low-frequency audio signal in the apparent sound stage when said sound signal is reproduced by said loudspeakers" in claim 20 does not result in a manipulative difference between the claimed invention and the method inherently performed by the compressor of Short et al. in normal operation, and therefore carries no patentable weight.

8. Regarding **claims 2 and 3**, absent any teaching to the contrary, it would have been obvious to one of ordinary skill in the art at the time the present invention was made to arrange the modules in the system of Iwamatsu, modified according to the teachings of Short et al. as described above regarding claim 1, in any convenient or logical manner, placing the vertical image correction module either before or after the bass enhancement module as an obvious design choice.

9. Regarding **claim 4**, Iwamatsu illustrates in Fig. 5 that correction provided by the image correction module (38) precedes image enhancement provided by the image enhancement module (64). As it is common in such systems to perform crosstalk cancellation as performed by "image enhancement module" 64 as a final step, prior to power amplification and loudspeaker reproduction (e.g., so that an equivalent binaural signal is available prior to the crosstalk canceller for headphone reproduction), it would have been obvious to one of ordinary skill in the art at the time the present invention was made to maintain the same relationship in the system modified to include the bass enhancement module of Short et al.

10. Regarding **claims 7 and 21**, although Applicant's disclosure has not clearly defined a difference between a perceived height of an apparent soundstage and a perceived vertical location of an apparent soundstage, and "height", as recited in claim 6, can generally mean either vertical location or vertical size, by focusing the apparent

vertical location of a sound image (stage) to a certain location as described at column 5, line 34 –column 6, line 11, the system of Iwamatsu inherently corrects (changes) a perceived vertical size ("height") and a perceived vertical location of an apparent sound stage produced by the plurality of loudspeakers (as heard by a listener).

11. Regarding **claims 8 and 22**, Iwamatsu discloses in Fig. 5 that the height correction (first) module comprises a left-channel filter (38-upper) to filter sounds in a left signal channel (SL) and a right-channel filter (38-lower) configured to filter sounds in a right signal channel (SR).

12. Regarding **claims 9 and 23**, Iwamatsu discloses at column 6, lines 5-12 that the left- and right-channel filters (38) are configured to filter (adjust frequency components of) the left and right channels in accordance with a variation in frequency response of a human auditory system as a function of vertical position of a sound source.

13. Regarding **claims 10 and 24**, Fig. 7B shows that the left- and right-channel filters (38) in the system of Iwamatsu are configured to emphasize lower frequencies (those lower than frequency "Nt") relative to higher frequencies (those proximate to frequency "Nt"), as broadly as claimed.

14. Regarding **claims 11 and 25**, in the sound enhancement system of Iwamatsu, modified according to the teachings of Short et al., the bass enhencement ("second")

module is configured to emphasize portions of lower frequencies relative to higher frequencies, as taught by Short et al. at column 1, lines 20-56 and column 4, lines 32-43 and illustrated in Fig. 2.

15. Regarding **claims 12 and 26**, in the sound enhancement system of Iwamatsu, modified according to the teachings of Fig. 3 of Short et al., the second sound enhancement module (Fig. 3 of Short et al.) is configured to receive a plurality (two) of input signals (11L and 11R) (which may also be referred to collectively as "a signal") and to emphasize common-mode portions of lower frequencies of the input signal(s) relative to higher frequencies of said input signal(s) (inherently, due to summer 17 and low-frequency bandpass filter 16).

16. Regarding **claims 13 and 27**, the sound enhancement module of Fig. 3 of Short et al. comprises a first combiner (17) configured to combine a[t] least a portion of a left channel signal with at least a portion of a right channel signal to produce a combined signal; a filter (18) configured to select a portion of said combined signal to produce a filtered signal; a variable gain module (15) configured to adjust (amplify) said filtered signal in response to an envelope of said filtered signal (the inherent mode of operation of a compressor) to produce a bass enhancement signal; a second combiner (14L) configured to combine at least a portion of said bass enhancement signal with said left

17. channel signal; and a third combiner (14R) configured to combine at least a portion of said bass enhancement signal with said right channel signal.

18. Regarding **claims 16, 17, 30, and 31**, the perceived width correction ("third") module 64 in the system of Iwamatsu inherently receives input signals comprising a left-channel input and a right-channel input, identifies a common-mode portion, provides a common-mode behavior in response to common-mode portions of the input signals, identifies a differential-mode portion, and provides a differential-mode behavior in response to differential-mode portions of the input signals; and these respective behaviors are inherently due to providing a common-mode transfer function and a differential-mode transfer function. (As described above regarding claims 1, 6, and 20, the crosstalk canceling network 64 of Fig. 10 of Iwamatsu will inherently [according to the examiner's analysis of the network] apply a differential-mode transfer function to difference information in the input signal pair, that is a comb-filter response plus a constant level offset, having dips at odd multiples of a frequency of approximately 833 Hz and peaks at even multiples of about 833 Hz. Further analysis reveals that a common-mode transfer function is applied to common-mode portions of the signal pair, that is complimentary in that peaks occur at odd multiples of 833 Hz, while dips occur at even multiples of 833 Hz.)

19. Regarding **claims 18, 19, 32, and 33**, although Iwamatsu does not directly disclose the differential-mode transfer function frequency characteristic of the perceived

width correction module (64) in the system, analysis of the block diagram shown in Fig. 10, as described at column 7, line 65 –column 8, line 53, indicates that for very low frequency differential-mode (equal and opposite) input signals the signal level at either output will be slightly greater than the level of the corresponding input signal since the 1.2-ms delayed signal (column 8, lines 40-45) fed back within a given channel will be substantially in phase with the input signal and the crosstalk canceling signal from the opposite channel will also be substantially in phase, since it is initially of opposite phase, delayed slightly to remain of substantially opposite phase, then inverted at element 84 or 88. As the frequency of the differential-mode input signal is increased, a point will be reached (833 Hz) where the delayed signals become of opposite phase with the input signal and the output signal will be at a local minimum level. As the differential-mode input signal frequency is further increased, the delayed signals will again become in phase with the input signal and the output will reach a local maximum (at 1.67 kHz). Additional peaks and dips will occur in the differential-mode transfer function frequency characteristic as the input frequency is further increased, with peaks occurring at each even multiple of 833 Hz and dips occurring at each odd multiple of 833 Hz. Thus, the differential-mode transfer function emphasizes lower frequencies (those far below 833 Hz) relative to higher frequencies (those around 833 Hz) and the differential-mode transfer function is configured to provide a first de-emphasis for frequency components in a first frequency band (around 833 Hz), provide a second de-emphasis for frequency components in a second frequency band (around 1.67 kHz), provide a third de-emphasis for frequency components in a third frequency band (around 2.50 kHz), and

provide a fourth de-emphasis for frequency components in a fourth frequency band (such as 3.33 kHz), said first frequency band lower than said second frequency band, said second frequency band lower than said third frequency band, and said third frequency band lower than said fourth frequency band, said second de-emphasis value and fourth de-emphasis value less than said first de-emphasis value and said third de-emphasis value.

20. Regarding **claims 34-36**, the system of Iwamatsu, modified according to the teachings of Short et al. as described above regarding claims 1 and 6, can be alternatively described according to the limitations recited in these claims without further modification; therefore, the claims are unpatentable by the same reasoning. Further regarding **claim 34**, many known "apparent sound stages" are "missing low-frequency sound energy corresponding to [a] lower-frequency sound signal" (e.g., due to the common use of small loudspeakers or the lack of lower-frequency components in some common audio signal source material); thus, it would have been obvious to one of ordinary skill in the art at the time the present invention was made to employ the system of Iwamatsu, modified according to the teachings of Short et al., in conjunction with such "apparent sound stages" (e.g., with small loudspeakers or audio source material lacking lower-frequency content) simply due to the commonness of, e.g., such loudspeakers and source material.

21. **Claims 14, 15, 28, and 29** are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwamatsu (US 5,999,630) in view of Short et al. (US 4,739,514) as applied to claims 6 and 20 above, and further in view of Davies and Bohn ("Squeeze Me, Stretch Me: The DC 24 User's Guide" [RainNote 130]).

22. Regarding **claims 14, 15, 28, and 29**, Short et al. disclose generally that the variable gain module comprises a compressor (which compresses the filtered signal during an attack time period) and at column 3, lines 50-52 that the compression ratio might be set to any other value besides the 2:1 ratio of the preferred embodiment in order to realize certain desired equalization curves, and may even be made variable as a function of input level to fit even more closely desired equalization curves. Sort et al. do not explicitly disclose operating the compressor with a compression ration of less than 1:1 (corresponding to expansion). Davies and Bohn disclose general guidelines for applying dynamic gain processing to audio signals. One solution proposed for correcting problems often introduced by compressing audio ("Idea Number Two") at the last paragraph of page 3, column 1 is to combine an expander/gate function with a compressor. Davies and Bohn disclose that the result is a sound with less "breathing" (a noticeable modulation of background noise as a desired signal varies at to an extremely low level). The composite dynamic gain characteristic of Fig. 2, incorporating gating (a very low compression ration, or equivalently, a very high expansion ratio [the inverse of compression ratio]), expansion (a compression ratio less than 1:1, e.g. 1:2, or equivalently, an expansion ratio greater than 1:1), compression (a compression ratio

greater than 1:1), and limiting (a very high compression ratio), illustrates the concept. Consistent with the suggestion of Short et al., recited above, the compression ratio is variable as a function of input level. It would have been obvious to one of ordinary skill in the art to provide a dynamic gain characteristic that combines expansion and compression, as taught by Davies and Bohn, in the dynamic equalizer of Short et al., employed in the system of Iwamatsu, in order to provide an enhanced bass output from the system while reducing artifacts such as breathing. In such an embodiment, the act of amplifying would comprise compressing said filtered signal during an attack time period (when the input signal level is above the compressor threshold and increasing) and expanding said filtered signal during a decay time period (when the input level is below the expander threshold and decreasing).

Response to Arguments

23. Applicant's arguments filed 10 December 2004 have been fully considered but they are not persuasive.

24. Although Applicant states that "Neither Iwamatsu nor Short teaches modulating the amplitude of a higher-frequency signal with a lower-frequency signal to produce an illusion of the lower-frequency signal to a listener when the signal is reproduced by loudspeakers", the examiner finds that Short does inherently perform the recited modulation in the compressor circuits disclosed (15 of Figs. 1 and 3, 20 of Fig. 4, 18 of

Fig. 5, 42 of Fig. 6, and 41 of Fig. 7), according to Applicant's description of the operation of such a compressor in the instant specification. As noted in the rejection of claims 1, 6, and 20, above, the statement of an intended purpose of the structure recited, "to produce an illusion of the lower-frequency signal to a listener", is of no patentable weight in apparatus claims 1-4, 6-19, and 24-36; and assuming Applicant's statement that the disclosed modulation of a first signal by a lower-frequency signal derived from the first signal's amplitude envelope in an automatic gain control circuit (compressor or expander) produces an illusion of the lower-frequency to a listener is correct, then the compressor of Short et al. inherently performs the same function in normal operation. MPEP 2112 states, "Something which is old does not become patentable upon the discovery of a new property".

Conclusion

25. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

26. Unemura (US 5,771,296) and De Poortere et al. (US 6,143,330) disclose systems and methods for bass frequency enhancement in which a low-frequency portion of an audio signal is full-wave rectified and low-pass filtered to produce harmonics (and inherently, intermodulation frequency products).

27. Komiyama et al. (JP 05300596 A) and Yoshida (JP 09224300 A) disclose systems and methods in which audio signals are filtered to correct a perceived sound image height.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tony M Jacobson whose telephone number is 571-272-7521. The examiner can normally be reached on M-F 11:00-7:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh N Tran can be reached on 571-272-7564. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SINH TRAN
SUPERVISORY PATENT EXAMINER

tmj
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April 26, 2005